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Remains of Birds from the Rexroad Fauna of the Upper Pliocene of Kansas

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ABSTRACT: From fossil bird remains from the Rexroad Fauna of the Upper Pliocene of Kansas, the following species are described as new: a duck, of the genus *Nettion*, a quail, genus *Colinus*, and a rail, genus *Rallus*. Aside from the described species, twelve other forms are recognized, four of which are referred to living species. The remaining forms are based on material too fragmentary to permit of specific identification.

THE Upper Pliocene deposits of Meade county, Kansas, through exploration by C. W. Hibbard, Curator of Vertebrate Paleontology at the University of Kansas and his assistants from 1936 to 1940, have given quantities of bones of the smaller vertebrates, the remains of mammals being especially abundant. With these there have been obtained many fragments of the skeltons of birds that Doctor Hibbard from time to time has forwarded to me for study. This report embodies the results of this work to date.

In brief résumé, these fossil deposits were first located in 1935 by men from a Civilian Conservation Corps camp who noticed various bones during quarry work in connection with a state lake project. They uncovered several large skeletons that were swept away and destroyed by a cloudburst. Doctor Hibbard came to the region in the summer of 1936, noted the smaller bones remaining, and began the careful sifting of the dump and the remaining deposits. The work continued during the summers from 1937 to 1940, with an extensive collection as the result. The present paper is the first report on the bird material obtained.

According to the account of Doctor Hibbard the region investigated lies along the valley of a stream tributary to Crooked creek

where the bird material was obtained at points designated as Locality 2 and Locality 3. Upper Pliocene deposits are found here in isolated areas, being exposed where streams have cut through the overlying strata of the Pleistocene. The bones are found in sand, sandy silt, clay, and bog material, with the sand in places consolidated. The bird bones in the main have come from the sandy areas, are light in color, and are easily broken. Occasional specimens are blackish brown, indicating deposition in boggy areas. Doctor Hibbard has designated the aggregation of species found in these Pliocene beds as the Rexroad fauna, and after analysis of the 32 identified species of mammals has indicated that this fauna has the approximate age in the upper Pliocene of the Blanco, Benson and Hagerman deposits, with closer affinity to the Blanco and Benson faunas.[1]

Bones of birds from the Pliocene of North America for years were rarely found, and as yet the life of this age is poorly represented in our lists in comparison with that of the Miocene and the Pleistocene. The present collection is one of the most important that has been obtained as it gives the largest number of forms from a single locality. As the specimens were secured by sifting that saved the smallest pieces many are too fragmentary for successful identification. However, a fair number have been named, giving much useful information. Three species are described as new, a quail, a teal and a rail. There are fragments of several other species that are unknown to science, but that are represented by such fragmentary material that definite description is not warranted. I see no point in naming bones, that while obviously from unknown species, cannot be placed generically with the material available. Such indiscriminate naming is confusing, and is always a hindrance in subsequent studies when other specimens in the same groups become available.

The bones in this collection from the species of the Order Passeriformes present a problem as yet unsolved. This order in the avian class has a far greater aggregation of living species than any other, and there can be no question but that the multitude of forms was even more extensive in the later part of the Tertiary. Osteological differences among these are present but are often obscure. In the Rexroad material it is possible to segregate bones belonging to the

1. For further details and fuller bibliography see the following papers:
Hibbard, Claude W., Paleoecology and correlation of the Rexroad Fauna from the Upper Pliocene of southwestern Kansas, as indicated by the mammals. Univ. Kansas Sci. Bull., vol. 27, No. 6, November 1, 1941, pp. 79-104, 1 text fig.

Frye, John C., and Hibbard, Claude W., Pliocene and Pleistocene stratigraphy and paleontology of the Meade Basin, southwestern Kansas. State Geol. Surv. Kansas, Bull. 38, December 5, 1941, pp. 389-424, 4 plates.

Fringillidae that are not like those of available skeletons of existing kinds, but of the several hundred species of this family recorded from the New World only a small part of those found now to the south of the United States are at present available. More than 175 species with several times that number of geographic races are known from North America and Central America, with a much larger group in South America. These are distributed among more than 100 distinct genera. While only a relatively small part of these reach Kansas today there is no question but that the variety there was greater at the end of the Tertiary than at present. There is also the certainty that numerous groups have become extinct before our time. Under these circumstances it has been necessary to leave the detailed study of the Passeriform specimens for later consideration when a larger variety of modern skeletons is at hand.

Of the identified specimens more than one-half belong to aquatic species that live in and around marshes, streams and ponds. Remains of turkeys represent birds of wooded areas, while parrots, pigeons and quail are species of forests, or regions where thickets and groves grow amid plains, prairies or savannas. The passeriform birds may have lived in prairie land, in thickets or in forests.

Of great interest are four birds that have been identified with species living today, the Rexroad occurrence being their most ancient records, carrying them back through the Pleistocene into the Upper Pliocene. While we may accept these Rexroad bones as specifically identical with the living representatives we may speculate on differences in the feathers that may have marked them as subspecifically quite different.

Drawings illustrating the new species here described have been made for me by Sydney Prentice.

ANNOTATED LIST

ORDER COLYMBIFORMES. Grebes

FAMILY COLYMBIDAE. Grebes

Colymbus sp.

The material from Locality 3 obtained in 1937 includes the proximal third of a right tarso-metatarsus, No. 4484, from a grebe of the genus *Colymbus*. The bird is definitely smaller than *Colymbus auritus* and *C. nigricollis*, being similar in the size of the head of the metatarsus to *Colymbus chilensis* (Lesson), found today from southern Perú, Bolivia and Uruguay south through Argentina and Chile to the Straits of Magellan. The shaft, however, is decidedly

more slender. The bone represents an unknown species, but must for the present remain undescribed because of the incomplete material.

In 1938 the party secured at Locality 2 the distal half of a right coracoid, No. 4652, that possibly represents the same unknown species. This bone is smaller than the coracoid of *Colymbus nigricollis, C. auritus* or *C. occipitalis,* the last species being from southern South America, but is slightly larger than *C. chilensis.*

ORDER CICONIIFORMES. Herons, Storks and Allies

FAMILY THRESKIORNITHIDAE. Ibises and Spoonbills

Threskiornithid, sp. incert.

A left coracoid, No. 4741, with the sternal end missing, from Locality 3 is from an ibis smaller than *Plegadis* and *Guara.* The bone is highly interesting as it represents an unknown species probably allied to *Plegadis,* but from the fragment available the genus cannot be definitely determined. The species was one from one-fourth to one-eighth smaller than the modern white and scarlet ibises and the glossy ibises. The small size for a bird of this group is intriguing.

ORDER ANSERIFORMES. Screamers, Swans, Geese and Ducks.

FAMILY ANATIDAE. Swans, Geese and Ducks.

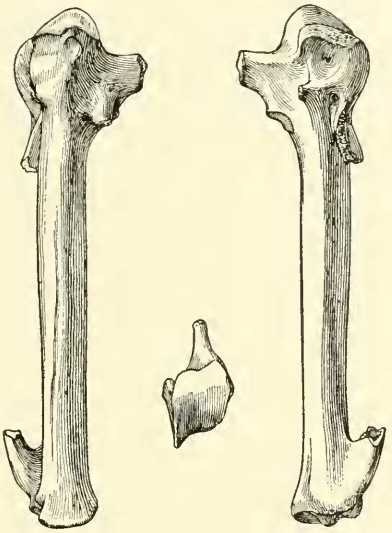
Nettion bunkeri sp. nov.

Characters. Carpo-metacarpus (figs. 1 to 3) similar to that of modern *Nettion carolinense* (Gmelin),[1] but metacarpal III and the proximal carpal trochlea distinctly heavier; metacarpal IV also heavier, as indicated by the proximal and distal unions with m III; facet for pollex larger.

Description. Type, right carpo-metacarpus with shaft of metacarpal IV missing, Kansas University Museum of Vertebrate Paleontology No. 3982, from Locality 3, Rexroad fauna, Ogalalla group, late Blancan age, Upper Pliocene, Meade county, Kansas, collected by Claude W. Hibbard and party in 1937. Carpal trochlea heavy, the internal one produced below in a sharp-edged compressed ridge; inner one with its lower margin notched so that its outline, as seen from behind, is definitely angular; a well-marked anterior carpal fossa, in form shallowly and irregularly cup-shaped; pisiform process moderate, but rising from a strong support that forms a straight-

1. *Anas carolinensis* Gmelin, Syst. Nat., Vol. 1, pt. 2, 1789, p. 533.

edged shelf at the base of metacarpal II, with another straight edge at right angles below, forming the distal margin of the internal ligamental fossa; metacarpal II compressed from side to side, with the point truncated and notched in front; facet for pollex expanded, with an irregular, rounded external projection; shaft of metacarpal III relatively strong, straight, rounded above and on its outer side, the inner and lower surface flattened, joining the outer face in an acute angle to form a long, straight ridge; tendinal groove faintly



FIGS. 1-3. Right carpo-metacarpus, type of *Nettion bunkeri*, twice natural size.

impressed; metacarpal symphysis, or fornix, relatively strong; metacarpal IV missing except at proximal and distal union with metacarpal III; distal end truncated. Bone lightly fossilized, light brownish white in color.

Measurements. Total length, 35 mm.; transverse width across carpal trochlea, 4.3 mm.; transverse width of proximal end of Metacarpal III, 3.6 mm.

Remarks. The specimen, except for heavier size, is a close counterpart of the living green-winged teal *Nettion carolinense*. The total length of the carpo-metacarpus is that of the male of the modern bird, and the length of the union of metacarpals III and IV is also the same. The heavier shaft and the heavier carpal trochlea are distinctive, as is the stronger pisiform process, and the broader,

stronger articulation for the pollex. Comparative measurements of a male of *Nettion carolinense* (U. S. N. M. No. 224,084) are as follows: Total length, 35 mm.; transverse width across carpal trochlea, 3.9 mm.; transverse width of proximal end of metacarpal III, 3.1 mm.

In its larger size then the fossil has something of the same relation to the living green-winged teal that *Querquedula floridana* Shufeldt, described from the Pleistocene of Florida, has to the modern blue-winged and cinnamon teal.

Study of this specimen has led to reëxamination of the proximal end of a right metacarpal, U. S. N. M. No. 10,936, collected by J. W. Gidley from the Benson local fauna of the Upper Pliocene, 2 miles south of Benson in the San Pedro Valley, Arizona. This bone in 1924 [2] I listed under the heading of *Querquedula*, species. In the twenty years since I first examined this specimen the National Museum collection of skeletons of modern skeletons of the Anatidae of the New World has been increased until adequate series of a number of species are at hand. These indicate that one of the differences in the carpo-metacarpus in *Querquedala* and *Nettion* is found in the metacarpal symphysis, which measures in length approximately 7 mm. or more in *Querquedula discors*, and 6.0 mm. or less in *Nettion carolinense*. The proximal end is quite similar in the two. The Benson fossil has the transverse measurement across the carpal trochlea 4.3 mm., and the transverse breadth of metacarpal III at its proximal end 3.7 mm. These measurements are definitely heavier than living *Querquedula discors* or *Q. cyanoptera*, and agree exactly with the fossil *Nettion bunkeri* from the Rexroad formation. The form of the pisiform process and the angles at its base are also identical. The specimen therefor is referred to *Nettion bunkeri*.

The species is named for Charles D. Bunker, of the Kansas State University Museum of Natural History, in recognition of his fruitful labor in building the collections long under his care, and of the writer's close association with him for many years.

Charitonetta albeola (Linnaeus) Bufflehead

A nearly complete tarso-metatarsus, No. 3984, was found at Locality 3. This specimen exhibits characters found in a series of eight skeletons of the modern bird, and from its size may have come from a female individual. The middle trochlea has the groove for the articulation of the basal phalanx very slightly broader, with the

2. Proc. U. S. Nat. Mus., vol. 64, art. 5, January 15, 1924, pp. 1, 3.

external flange at the distal end slightly lower, than in several of the modern specimens, but the condition is almost equaled in two others. The difference is very slight and is probably individual. In general conformation the fossil checks closely otherwise with the modern material.

The bufflehead has been reported previously from the Pleistocene of Fossil Lake, Oregon, and from the asphalt beds at McKittrick, California. The Rexroad specimen is the first record for the Pliocene.

The study of this Rexroad material has led to examination of certain other fossil specimens that I have identified in the past, among them three fragmentary metacarpals, U. S. N. M. No. 16749, from the Pleistocene of Florida, obtained by W. W. Holmes in Pinellas county, Florida. In 1931 [3] I listed these under *Querquedula floridana*, an extinct teal known from the Pleistocene beds of Florida. Since that time the National Museum has built up larger series of the skeletons of the Anatidae so that the characters of the skeleton may be better understood. On further study now it develops that two of the Pinellas county metacarpals in which metacarpal No. 3 and the distal fornix are practically complete are those of *Charitonetta albeola*. The third with the distal end missing may be referred to the same species. The record constitutes another locality for this species in the Pleistocene.

Anatidae, not identified

Bones of ducks are common in the Rexroad collection but except for the type of *Nettion bunkeri* and the specimen of the Bufflehead are too fragmentary for specific identification. Possibly five species are represented, perhaps one or two more, as indicated by size differences and other variations.

Three fragmentary humeri are slightly larger than living blue-winged or green-winged teal, as is one broken coracoid. Possibly these may have some connection with *Nettion bunkeri*, but this is uncertain.

Slightly larger ducks are represented by the worn distal end of a tibio-tarsus, and parts of a scapula, a coracoid, and an ulna.

There is a coracoid and a scapula of one still larger form, and the broken coracoid and part of a femur of another, the one last mentioned being a little smaller than a mallard.

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3 Smiths. Misc. Coll., vol. 85, No. 2, April 13, 1931, p. 22.

ORDER FALCONIFORMES. Vultures, Hawks and Falcons

FAMILY ACCIPITRIDAE. Hawks

Buteo sp.

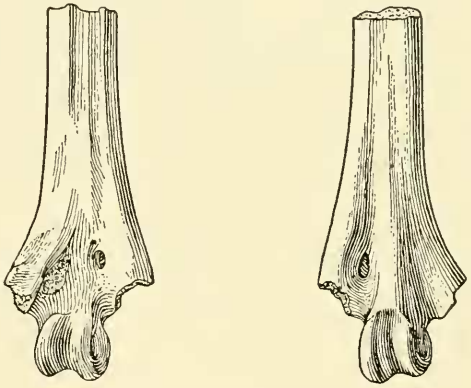
In miscellaneous bones secured in the season of 1937 there is the anterior end of a sternum, considerably worn, that comes from a large hawk about the size of the red-tailed hawk *Buteo jamaicensis.*

ORDER GALLIFORMES. Megapodes, Curassows, Pheasants and Hoatzins

FAMILY PHASIANIDAE. Partridges, Quails and Pheasants

Colinus hibbardi sp. nov.

Characters. Distal end of tarso-metatarsus (figs. 4 and 5) similar to that of modern *Colinus virginianus* (Linnaeus) [4] but decidedly larger; shaft stronger, and more heavily lined by the tendinal grooves.



FIGS. 4-5. Distal end of right tarso-metatarsus (fragmentary), type of *Colinus hibbardi,* three times natural size.

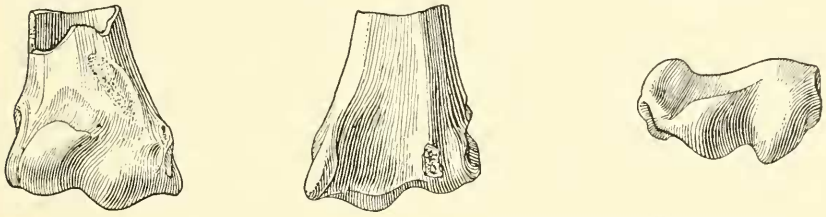
Description. Type, Kansas University Museum of Vertebrate Paleontology No. 3981, distal portion of right tarso-metatarsus, with the main parts of the outer trochlea missing, collected in 1937 from Locality 3, Rexroad Fauna, Ogalalla group, late Blancan age, Upper Pliocene, Meade county, Kansas, by Claude W. Hibbard and party. Shaft strong, flattened distally, with three sharply angular lines marking tendinal grooves on posterior surface; facet for hallux large and well marked; anterior face with a broad, shallow groove leading

4. *Tetrao virginianus* Linnaeus, Syst. Nat., ed. 10, vol. 1, 1758, p. 161.

down into the relatively large inferior foramen; outer trochlea missing except for the expanded base; middle trochlea strong, elliptical in lateral outline, with its lateral faces slightly excavated; a shallow groove extending clear around the articular surface, beginning in a definite depression on the anterior face; the outer flange bordering this groove slightly heavier than the inner, and on the posterior face extending farther up toward the inferior foramen; inner trochlea, with distal tip missing, strongly developed. Bone white, with a slight brownish tinge, well preserved though not heavily silicified.

Measurements. Transverse breadth of shaft below center, 3.1 mm.; transverse breadth across trochlea (approximate), 7 mm.; transverse breadth of middle trochlea, 2.9 mm.

REMARKS. In spite of its fragmentary condition it is readily evident that this specimen comes from a *Colinus,* and on comparison it



FIGS. 6-8. Distal end of right humerus, Kansas University Museum of Vertebrate Paleontology No. 3997, identified as *Colinus hibbardi,* three times natural size.

is so definitely large that there is no difficulty in separating it as a distinct species from the modern forms. Its characters are such as to place it with *Colinus* and to separate it from *Lophortyx* and *Callipepla. Lophortyx* differs in the more angular development of the posterior side of the middle trochlea. *Callipepla* has more slender form throughout. *Cyrtonyx* is decidedly different, as in spite of the stocky form of the shaft the trochlea are reduced in size.

The distal end of a right humerus, No. 3997, was secured at Locality 3, likewise in 1937. This specimen (figs. 6 to 8) is well preserved and little worn. In general it is like *Colinus virginianus* except for slightly larger size. The brachial depression is relatively larger, with the ridge bordering it longer, extending farther up the shaft. The bone has the size of an adult male of *Cyrtonyx montezumae mearnsi,* but the trochleae are definitely smaller. *Callipepla squamata* is fairly close to *Colinus virginianus* in the form of this

part of the humerus, but has the radial trochlea larger, this being actually about as large as in the fossil though the latter is from a bigger bird. *Lophorytyx californica* and *L. gambeli* have the brachial depression definitely smaller. In the fossil the transverse breadth across the trochleae measures 18 mm. In two *Colinus virginianus* this dimension is 16.7 and 17.1 mm. The difference in bulk is easily apparent on direct comparison.

The distal end of a left humerus, No. 4660, was collected in 1938 at Locality 2 in Meade county, a bone that is so badly worn that it can barely be identified. It also measures 18 mm. in transverse breadth across the trochleae, but offers no other points that are pertinent.

Study of these specimens has led to critical examination of *Colinus eatoni* Shufeldt[5] described from an unknown geological horizon in western Kansas. The type material according to Doctor Shufeldt consists of a left carpo-metacarpus and the proximal phalanx of an index digit. The description is brief, but from the illustration it appears that the metacarpal may come from some oscinine Passeriform bird, possibly an Icterid, or a Fringillid, a matter to be decided by examining the original bone. The digit may represent another species of bird. The species, therefore, is to be removed from the genus *Colinus*.

Colinus hibbardi is named for Claude W. Hibbard in recognition of his painstaking and careful work in developing the Rexroad fauna.

FAMILY MELEAGRIDIDAE. Turkeys

Meleagris gallopavo Linnaeus. Turkey

A left tibio-tarsus, with the shaft shattered in the region of the peroneal ridge, was obtained in Locality 3. This bone was broken but the fragments were present so that it could be repaired and restored until the conformation is as it was originally. The specimen is one of moderate to small size, and agrees in all of its characters with modern specimens of the wild turkey.

It is the first record of this species from the Pliocene.

Meleagrididae, sp. ?

The proximal third of a scapula, No. 3993, taken at Locality 3, in 1937, comes from a turkey-like bird of rather small size. It differs from the turkey, *Meleagris gallopavo,* and from the ocellated turkey, *Agriocharis ocellata,* in lacking a pneumatic foramen on the outer

5. Trans. Connecticut Acad. Arts Sci., vol. 19, February, 1915, p. 70, pl. 13, fig. 103.

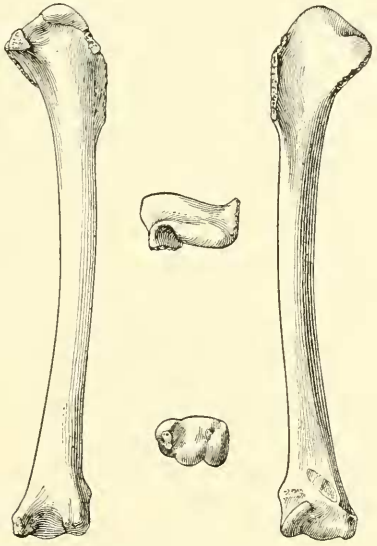
face between the furcular articulation and the glenoid facet. The form also is more slender. The generic identity of the bird represented by this fragment is uncertain. It may be noted that the specimen is very dark brown in color, quite different from the other bird bones in this collection, an indication that its method of preservation has been different.

ORDER GRUIFORMES. Cranes, Rails and Allies

FAMILY RALLIDAE. Rails, Gallinules and Coots

Rallus prenticei sp. nov.

Characters. Humerus (figs. 9-12) rather similar to that of modern *Rallus limicola Vieillot*[6] but slightly heavier; crista superior



FIGS. 9-12. Right humerus, type of *Rallus prenticei,* twice natural size.

longer and heavier; ectepicondylar prominence slighter; trochleae relatively smaller; entepicondylar prominence slighter.

Description. Type, right humerus, nearly complete, Kansas University Museum of Vertebrate Paleontology No. 3865, from Locality 2, Rexroad fauna, Ogallala group, late Blancan age, upper Pliocene, Meade county, Kansas, collected by C. W. Hibbard and party in 1936. Proximal end of bone averaging strong and heavy compared with related modern rails; head merging smoothly into shaft on

6. *Rallus limicola* Vieillot, Nouv. Dict. Hist. Nat., vol. 18, 1819, p. 558.

aneonal aspect, with a strong external tubercle; capital groove in outline a rectangle, the bottom slightly excavated, slightly under cut at lower margin, otherwise with the walls rising at a right angle from the base; internal tubercle relatively strong (distal point missing); crista superior relatively long (free margin partly broken), with a prominent attachment for the pectoralis major; a considerable concavity on the aneonal aspect below the internal tubercle, but no open pneumatic foramen; palmar aspect of head with a lightly marked deltoid groove; bicipital surface smooth, slightly convex; shaft fairly strong, with a slight flexure; line of attachment for latissimus dorsi slightly marked; lower end of shaft expanding slightly to support the distal trochlea; impression for brachialis anticus rather small, more heavily impressed toward outer margin; ectepicondylar process small, projecting slightly; radial and ulnar trochleae both rather small; entepicondylar process small; external and internal tricipital grooves very lightly marked; olecranal fossa shallow; distal end of entepicondyle (slightly worn) not projecting beyond distal leval of ulnar trochlea; groove between ulnar and radial trochleae broadly open. Bone very light brownish white in color.

Measurements. Total length, 36.1 mm.; greatest breadth across head, 7.1 mm.; transverse breadth of shaft at center, 2.1 mm.; transverse breadth through trochlea, 5.1 mm.

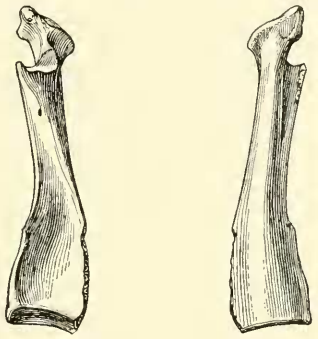
Remarks. While in length the type humerus is similar to the living Virginia rail *Rallus limicola* it is slightly though definitely heavier. The greater length and strength of the crest for the attachment of the large breast muscle is especially evident and would seem to indicate a bird of more active powers of flight. There is, however, a lesser development of the articulations of the lower end of the humerus.

A second humerus, No. 3866, from the left side, with the anterior third more or less missing, was collected at Locality 3 in 1937. This bone so far as it is preserved is in excellent condition and seems somewhat more silicified than the type. It comes from a slightly larger individual as indicated by the following measurements: Transverse breadth of shaft, 2.6 mm.; and transverse breadth across trochleae, 5.3 mm. The size differences are those found between male and female of the modern Virginia Rail, so that it is reasonable to suppose that the type may be from a female individual and that the broken bone from Locality 3 comes from a male.

Comparable measurements of the humerus of the Virginia Rail have been taken from male and female of that bird collected in

Meade county, Kansas, in December, 1942, by Henry Hildebrand for the Museum of Natural History of Kansas University (catalogue numbers 23216 and 23217). These have been loaned to me for study through the courtesy of Charles D. Bunker. The measurements follow, that of the humerus of the male being given first in each instance: Total length, 39.0, 36.1 mm.; greatest breadth across head, 7.0, 6.7 mm.; transverse breadth of shaft at center, 2.2, 2.0 mm.; transverse breadth through trochleae, 5.1, 4.6 mm.

In 1937 a right coracoid, No. 3867, was secured at Locality 2 that obviously refers to *Rallus prenticei* (figs. 13 and 14). The bone has



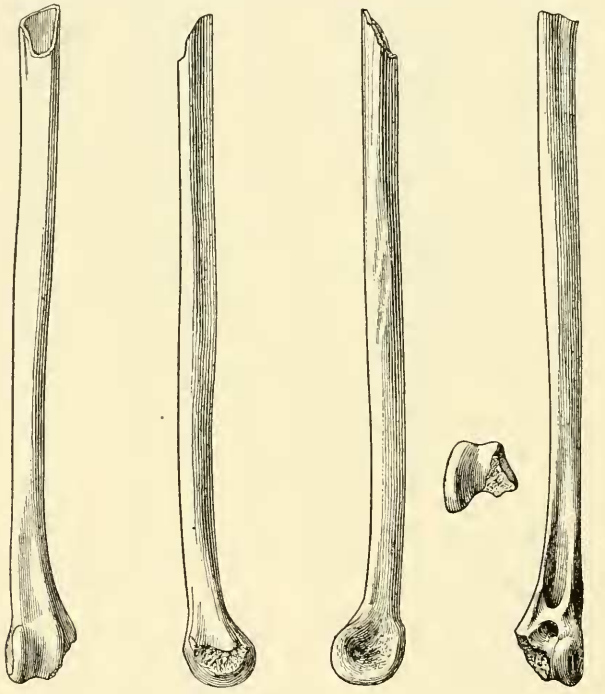
FIGS. 13-14. Right coracoid, Kansas University Museum of Vertebrate Paleontology No. 3867, identified as *Rallus prenticei,* twice natural size.

the outer angle, adjacent to the sternal articulation, and the end of procoracoid missing, but otherwise is complete. Except for definitely larger size it is closely similar to the Virginia Rail. In total length the fossil measures 21.6 mm., while in the largest male Virginia Rail available (U. S. N. M., No. 322701, a bird of unknown locality) this dimension is 18:5 mm. The sternal facet in the fossil is well developed, and the bone as a whole is definitely larger and stronger than in the modern species. A second coracoid from the left side, No. 3868, with the sternal end missing, was obtained in 1937 at Locality 3.

In 1936 the broken distal end of a right tarso-metatarsus, No. 3869, was found at Locality 2. The trochleae are all broken, so that the only note of importance that may be made is the observation that the shaft at its lower end is slightly larger than in the male of the modern Virginia rail.

In the same year of 1936 the distal end of a right tibio-tarsus, No. 3870, was collected at Locality 2, a bone with the condyles somewhat worn so that most of the finer characters are gone. This bone also is definitely heavier than the corresponding one in the male Virginia rail, measuring 2.7 mm. at the smallest transverse diameter of the shaft, this being 2.3 mm. in the largest modern bird. The distal end also is obviously heavier.

The final specimens consist of a right humerus with the head missing, No. 3871, and a left tibio-tarsus (figs. 15 to 19) with the proximal end gone and the distal end considerably broken, No. 3872,



FIGS. 15-19. Left tibio-tarsus, with the proximal end missing, Kansas University Museum of Vertebrate Paleontology No. 3872, identified as *Rallus prenticei*, twice natural size.

that were found in 1936 at Locality 2 lying on top of the dump left by enthusiastic if ill-advised excavations on the part of the young men of the Civilian Conservation Corps who had discovered this deposit of fossil bones. From their exposed situation Doctor Hibbard was not entirely certain that these bones might not be of Recent age. They appear slightly whiter than the majority of the

bones from this place, but there is variation in this regard, some of the undoubted upper Pliocene material being equally white. The humerus has the slightly stockier form with smaller trochleae and slighter ectepicondylar process of *Rallus prenticei*. The tibio-tarsus seems to be from an immature individual that may not have quite attained full growth. The shaft is more slender than the other seen, but the distal end is heavy in spite of the immaturity indicated by the partly developed form of the supra-tendinal bridge. It also is *prenticei*. I believe that there can be no doubt that these two bones belong in the upper Pliocene with the other Rexroad material.

This extinct rail, from consideration of all the bones described, apparently was a bird slightly larger and stockier in build than the living Virginia Rail *Rallus limicola*. Apparently it was common in this locality as its remains are among the most abundant of those preserved.

Fulica americana Gmelin. Coot

The distal end of a left humerus, No. 3994, was collected in 1937 at Locality 3, the bone being in excellent state of preservation. With it there was found a complete left ulna, No. 3988. This species has been recorded widely in the North American Pleistocene from Florida and Texas to Oregon and California, and is here reported for the first time from the Pliocene.

ORDER CHARADRIIFORMES. Shore-birds, Gulls and Auks

FAMILY SCOLOPACIDAE. Snipe, Woodcock and Sandpipers

Scolopacidae, sp. ?

A species of sandpiper of small size is represented by the distal half, more or less, of a right humerus, No. 4488, from Locality 3. The end of the ectepicondylar process is missing, and some of the other processes show wear. The bone is about the size of the humerus in *Pisobia fuscicollis*, and the species may have been one near that group of sandpipers. It does not seem practicable to identify it more definitely at present.

FAMILY LARIDAE. Gulls and Terns

Sterna sp.

In 1937 the party secured a fragmentary left carpo-metacarpus, No. 3989, at Locality 3 that is identified as a tern of the genus

NOTE.—This species is named for Sidney Prentice, now deceased, loyal alumnus of Kansas University, in recognition of his skill and accomplishment in the delineation of vertebrate fossils.

Sterna. The bone lacks much of the head and most of the third metacarpal. It is about the size of the corresponding bone in Forster's Tern *Sterna forsteri*.

ORDER COLUMBIFORMES. Sand-grouse, Pigeons and Doves

FAMILY COLUMBIDAE. Pigeons and Doves

Zenaidura macroura (Linnaeus). Mourning Dove

A left humerus, No. 3995, with the distal end missing, collected at Locality 3 in Meade county in 1937, is typical of the Mourning Dove. While the White-winged Dove *Zenaida asiatica* (listed in the fourth edition of the A. O. U. Check-list published in 1931 under the generic name *Melopelia*) is similar in size, the tuberculum laterale on the posterior dorsal surface of the head is definitely longer and heavier. In the smaller size of this tubercle and in all of its other details the fossil agrees completely with *Zenaidura macroura*.

The mourning dove has been found in Pleistocene deposits in Pinellas county, Florida, and at McKittrick and Rancho La Brea, California, but is here first recorded from the Pliocene. The size of the fossil is that of male examples of the modern bird.

ORDER PSITTACIFORMES. Parrotlike Birds

FAMILY PSITTACIDAE. Lories, Parrots and Macaws

Psittacidae, sp. ?

The proximal end of a left metacarpal from Rexroad Locality 2, collected in 1938, comes from a parrot of medium size. It represents a bird smaller than the Thick-billed Parrot *Rhynchopsitta pachyrhyncha* and larger than the White-fronted Parrot *Amazona albifrons*, but except for this there is not much that may be said about it. The pisiform process is gone, and the specimen is considerably worn otherwise. There is no question but that it represents an unknown species, but the material is too fragmentary to allow proper allocation except to family.

ORDER PASSERIFORMES. Perching Birds

Passeriformes, not identified

The siftings from Localities 2 and 3 of the Rexroad fauna have given us premaxillae, maxillae, humeri and occasional other bones of perching birds, some of them preserved in excellent condition. These have been segregated but after some study for the present are left unnamed. The Order is the most abundant of existing birds as

to species. The great majority are small in size, and many show surprising similarity in form of the bones of the skeleton. It is difficult to identify individual bones of many of the species of the Order that now live in the Plains area of the United States. When to this difficulty we add the further complication of the antiquity found in the Rexroad specimens the situation becomes so involved that at this time I do not care to attempt to identify the species that are represented. There is no question but that several are new to science but to merely name these without being able to assign them to a proper place in relation to the others that are known would only add to our fossil list without contributing in any way to our systematized knowledge. Description should wait for a time until our collections of the modern species, particularly among the vast number found in the region to the south of the United States, are more complete.

In the material at hand there are at least two species, probably more, of Fringillidae, and one Icterid. Others probably include other species of these families and of Compsothlypidae. All appear to belong to the suborder Passeres, and all are of small to medium size.